

# CRACKING THE VOCODER

HOW ARKANSAS BECAME A NATIONAL LEADER  
IN COMPUTER SCIENCE & COMPUTING



#ARKidsCanCode



# A LOT CAN HAPPEN IN FIVE YEARS.

Students learn and grow. Education evolves. Technology transforms the landscape of daily life. Since 2014, Arkansas has experienced all of these changes and more in regards to computer science and coding in schools throughout the state. Five short years have seen us go from coding novices to national leaders, blazing a trail for other states to follow.

This report offers just a glimpse of the vision, research, investment, planning, training, teaching and doing that went into that journey. Read on to see how Arkansas has advanced computer science and coding in the last five years - and find out what to expect in the years to come.



## Components of Computer Science Success



### 1) Standards, Curriculum and Pathways

Successful implementation of computer science education in Arkansas requires the development and periodic revision of a comprehensive and vertically articulated set of K-12 computer science curriculum standards and courses; the local creation of well-developed curriculum that supports student learning, proper alignment of the K-12 expectations and opportunities to industry needs; and appropriate K-20 pathway development for students seeking formal computer science education beyond high school.

### 2) Educator Development and Training

Successful implementation of computer science education in Arkansas requires the Arkansas Department of Education and its partner organizations to anticipate and address the needs of the Arkansas educational system with regards to knowledgeable and informed computer science teachers. ADE, in collaboration with the Arkansas Educational Cooperatives and other partners, must support quality computer science educator development and training opportunities for all Arkansas educators and administrators.

### 3) Licensure

Successful implementation of computer science education in Arkansas requires the ADE and its partner organizations to anticipate and address the needs of the Arkansas educational system with regards to licensed and endorsed computer science teachers. ADE will continue and further research and implement, when appropriate, flexible licensure pathways and practices based on legislation and regulation.

### 4) Outreach and Promotion

Successful implementation of computer science education in Arkansas requires the active use of a broad range of mediums, digital tools and human networks to properly communicate about the "Arkansas Computer Science Education" initiative and respond to the needs and concerns of Arkansas students, educators, community members and industry leaders.

### 5) Program Growth and Student Success

Successful implementation of computer science education in Arkansas requires encouraging broad school implementation, supporting lighthouse schools to expand their programs, increasing statewide teacher capacity, growing student interest, and increasing stakeholder interest and support through the use of innovative programs and outreach initiatives.

# START AT THE SOURCE CODE

Hutchinson Plan For Job Creation Through Technology Education: ARKANSAS HAS AN OPPORTUNITY

# 2014



STUDENT ENROLLMENT: 1,104

<SOURCE CODE>

is the list of human-readable instructions that a programmer writes – often in a word processing program – when developing a program.

On January 13, 2014, Asa Hutchinson announced a bold plan to position Arkansas as a national leader in technology education and job creation. Hutchinson – a gubernatorial candidate at the time – had shared his vision for making computer science a greater point of emphasis throughout the state. Now, his vision has become something more.

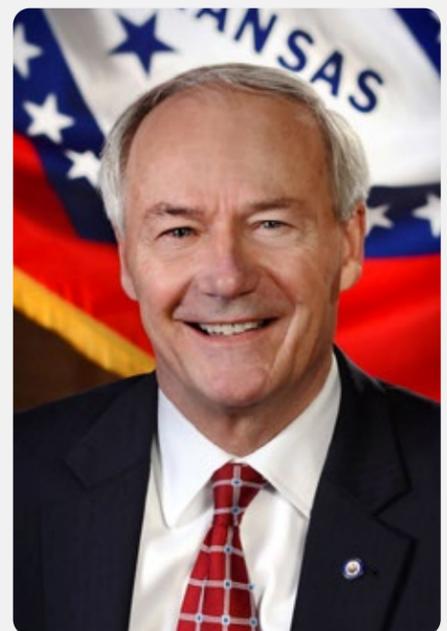
The plan that Hutchinson unveiled was innovative. It was detailed. It outlined clear technical and economic goals for Arkansas, as well as the steps it would take to get there. The plan would eventually serve as the foundation of the Arkansas Department of Education's Computer Science Initiative. Key elements include:

- Computer science courses will be made available in every high school in Arkansas. At the time, only a small number of high schools in Arkansas offered computer science, and nationally less than 1 in 10 schools offered the curriculum. Computer science courses were to include topics such as coding and programming.
- Computer science classes will become a fundamental part of standard curriculum and will count toward core graduation requirements. This represented a shift in mindset about where coding might fit within the curriculum. When the plan was announced, math or science credit was not given for computer science. Hutchinson would work with the legislature to make progress toward this goal.
- Technical training in high schools will be reinforced by enhancing the curriculum in both two-year and four-year colleges.

Governor Hutchinson's original vision for technology education and economic growth is becoming our shared reality, with Arkansas being recognized as a national leader in computer science education. In short? Our students aren't just being equipped for the future. They're creating it.



Through encouraging computer science and technology as a meaningful career path, we will produce more graduates prepared for the information-based economy that represents a wide-open job market for our young people.



– Asa Hutchinson, 2014

# UNDERSTANDING THE OPPORTUNITY



- > **The study of computer science**, particularly coding, opens more economic opportunity for more people than almost any other area of study. While millions of Americans are unemployed, the nation suffers from a severe shortage of people who can write computer software.
- > **This skill set is in demand** not just in the tech sector, but in banking, entertainment, medicine and virtually every area. Whether our children want to be farmers, doctors, teachers or entrepreneurs, they will all benefit from the creativity and problem-solving skills that are the essence of creating computer software.
- > **Learning to code**, even at a high school level, produces rewards quickly. Computer programmers start at rates as high as \$15-20 an hour or more. Learning to code is one of the best paths to entrepreneurship as you can start a profitable business with little or no upfront capital.
- > **Knowing how to code** may one day be a basic workplace expectation – like basic computer skills, or proficiency in various office software programs.
- > **Not only do successful programmers earn** well above average, they often become entrepreneurs who create new jobs for many others. From their ideas come companies that employ sometimes thousands of people with a variety of non-programming skills.
- > **Nationally, only 2% of students** study computer programming. If we triple that to 6%, we would close the gap between students and jobs, driving \$500 billion in economic value to our country.

## MORE 2014 HIGHLIGHTS

- **The new plan is featured** in *Talk Business & Politics* in an article titled “Asa Hutchinson Advocates For Computer Science Emphasis In Education.”
- **Computer science, particularly coding**, is included as part of Asa Hutchinson’s campaign for Arkansas governor.
- **Mathematics and computer science** curriculum framework is developed.
- **Stakeholders begin to be gathered** in preparation for the formation of a curriculum subcommittee.

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### Asa Hutchinson Advocates For Computer Science Emphasis In Education

by [Talk Business & Politics staff](#) (staff@talkbusiness.net) | January 13, 2014 4:04 pm | 47 views

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It is a notion he has talked about repeatedly **in the past**, but today Republican gubernatorial candidate Asa Hutchinson released a white paper calling for more computer science education in public schools.

Hutchinson said Arkansas could become a national leader in education by adding “coding and programming” courses to its curricula. He said his plan was crucial to “creating the job skills used in an

CAMPAIGN FOR GOVERNOR

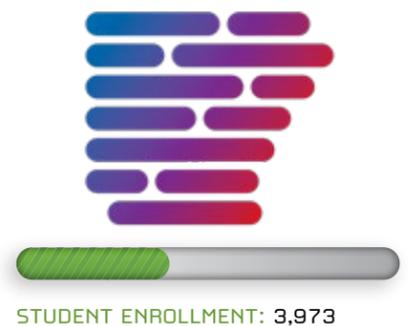
#ARKidsCanCode #HourOfCode

# GET WITH THE PROGRAMMING

Act 187 Brings Computer Science to Every High School in Arkansas

# 2015

**<A COMPUTER PROGRAM>**  
is a collection of instructions that performs a specific task when executed by a computer.



Governor Asa Hutchinson signs HB1183 into law, making computer coding classes available in every Arkansas high school  
February 24, 2015 - Governor's Conference Room

**The time for official change had arrived.** On February 24, 2015, as part of the regular session of the 90th Arkansas General Assembly, Governor Asa Hutchinson signed HB1183 into law – making computer coding classes available in every Arkansas high school beginning in the 2015–16 school year.

**Act 187** was sponsored by Representative Bill Gossage and others, with strong bipartisan support. Funding was established

at \$2.5 million per year, for a total of \$15 million being allocated and \$12.5 million being funded so far. This is the most per capita of any state in the nation. It was a low investment for taxpayers that would deliver high return for Arkansas students – without costing them anything.

The legislation also established the Arkansas Computer Science and Technology in Public School Task Force, which would be instrumental in planning effective implementation over the coming months and years.

Act 187 was more than just a groundbreaking move for us. Arkansas was the first state to meet all nine of Code.org's policy suggestions for computer science education, including being the first state to pass comprehensive legislation to bring it to high schools throughout the state. In fact, Code.org still uses Arkansas as an example of best practices for comprehensive computer science initiatives.

By making this education a priority, Arkansas leaders made a commitment to our students, their futures and the future of our entire state – and we were just getting started.

## DEVELOPMENT OF THE COMPUTER SCIENCE TEAM

### JULY 2015

Anthony Owen is appointed to the newly created state director of computer science position.

### AUGUST 2016

The special project gained an office and an administrative assistant.

### DECEMBER 2016

The first four computer science specialists come on board: Kelly Griffin, Jim Furniss, Zack Spink and Leslie Savell.

### JANUARY 2017

Tammy Glass and Jigish Patel join the team.

### MAY 2018

Eli McRae joins the team.

### AUGUST 2018

The group welcomes Lori Kagebein.

### MARCH 2019

Joshua Rodgers joins the team.

### JULY 2019

John Hart replaces Jigish Patel, who went to Duke University to work on his Ph.D. in computer science.

# MORE 2015 HIGHLIGHTS

- [A computer science grant](#) allows districts/schools to apply for up to \$20,000 to promote computer science education and build the local capacity to provide computer science instruction.
- [At its May 2015 meeting](#), the state Board of Education adopted the Praxis™ Computer Science [5651] test, which is required for Computer Science [4-12] licensure.
- [Governor Hutchinson](#) embarks on a coding tour.
- [Individuals who pass the Praxis™ Computer Science assessment](#) for an Arkansas educator license in Computer Science can be eligible for a one-time assessment fee reimbursement by the Arkansas Department of Education.
- [AP computer science principles are added](#) to the list of approved ACT 187 courses for the 2016-17 school year.
- [Head of the Class Bash](#) – Hour of Code event is held at the Clinton Presidential Center on August 15, 2015.
- [Alma Middle School students create](#) – and get to play – video games, then vote on their favorites.

## CODING TOUR



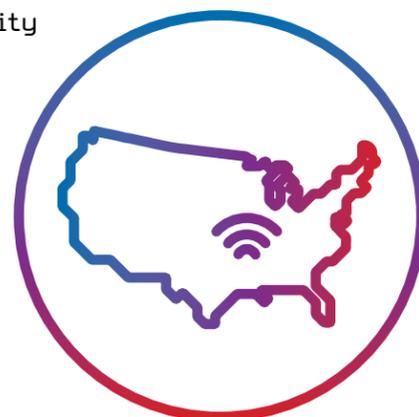
## HEAD OF THE CLASS BASH



## ALMA MIDDLE SCHOOL



- [Governor Asa Hutchinson](#) and First Lady Susan Hutchinson hosted the Girls of Promise Coding Summit at the governor's mansion on December 9, 2015.
- [During a December press conference](#), Governor Hutchinson announced a first-of-its-kind K-8 computer science initiative. The Computer Science Task Force also released its initial report of activities, findings and recommendations.
- [Development is completed](#) for K-8 computer science frameworks.
- [Arkansas established a national model](#) for the computer science flex credit, which allows a high-quality computer science course to count in place of a 4th-year math or 3rd-year science; it was adopted by the state Board of Education on April 9 and has been lauded by Code.org as a national model.



## GIRLS OF PROMISE CODING SUMMIT



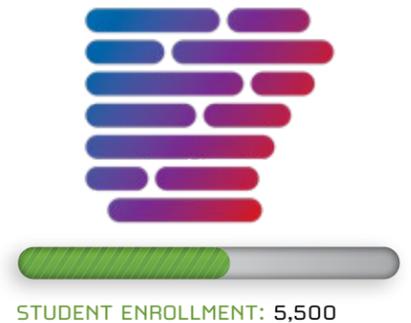
# SETTING OUR TASKS

Act 187 Task Force Issues Activities,  
Findings and Recommendations

CODING DEFINED

In computer programming, a `<TASK>` is a basic unit of programming that an operating system controls.

# 2016



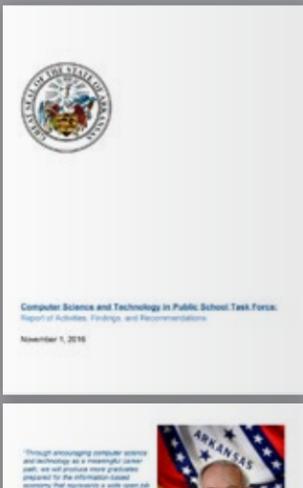
Passing legislation was just the beginning. The next step? Working on incentives and encouraging students to take computer science classes. That was the other key aspect of Act 187; it designated a task force to drive strategy for – and interest in – programs for computer science education and coding in Arkansas schools. On April 3, 2015, Governor Hutchinson appointed members to the Arkansas Computer Science and Technology in Public School Task Force and charged them with three responsibilities:

- 1** Research and recommend computer science and technology courses and content focus.
- 2** Study the computer science and technology needs of the state.
- 3** Recommend strategies to meet the anticipated computer science and technology workforce needs of the state.

The full task force had its inaugural meeting in April 2015, and met again in May, June, July, September and October, with numerous subcommittee meetings along the way.

After all of the information was gathered, findings were compiled and recommendations were identified, a report was released on November 1, 2016. From that moment on it became part of our own code for success, ushering in a new age of innovation and technology in Arkansas schools.

REPORT



## REPORT HIGHLIGHTS

- > **THE 2016 REPORT** of the CSTF contains information and suggestions regarding Arkansas' efforts and needs of recruiting and retaining computer science teachers; providing relevant and purposeful professional development for all teachers; active and sustained engagement of the initiative for students, parents, educators, industry leaders and state agency representatives; and other critical success factors for the initiative.
- > **ACT 187 REQUIRES** that every Arkansas public high school and public charter high school offer at least one computer science course at the high school level; however, the greatest obstacle to the long-term success of the initiative is the lack of qualified and certified computer science teachers in the state.
- > **ONGOING STATE FUNDING** for teacher preparation, recruitment and professional development; state, district and school infrastructure/hardware; and curriculum development at both the state and local level is necessary for the success and long-term growth of this initiative.
- > **COMPUTER SCIENCE TEACHER RECRUITMENT AND RETENTION** is also critical to the expansion of computer science course offerings, beyond the minimums required by Act 187, across the state.
- > **ACCORDING TO CODE.ORG**, 67% of new STEM jobs are in computing, but only 8% of STEM graduates are in computer science. There are currently more than 1,750 open computing jobs in Arkansas at an average salary of \$68,933, yet there were only 250 computer science graduates in 2015. Therefore, funding computer science education provides Arkansas with the opportunity for a very high job market return on investment.

# MORE 2016 HIGHLIGHTS

- [Governor Hutchinson announced](#) the inaugural All-State Coding Competition [see feature in next section].
- [In January, the ADE announced a grant](#) opportunity to provide free professional development in computer science to Arkansas educators, with up to \$750,000 in total grant funding.
- [Arkansas students participated](#) in the Congressional App Challenge.
- [The 19th edition of CodeWars](#), now a cooperative effort between Hewlett Packard Enterprise and HP Inc., included its newest site - Conway, Arkansas. More than 1,300 teams at eight locations competed against their programming peers.
- [Computer science courses](#) through Virtual Arkansas are made available at no cost to districts for the 2016-17 school year.
- [Frameworks are developed](#) for grades 9-12 computer science courses.
- [The College Board endorsed](#) AP Computer Science Principles curriculum and professional development.

## CONGRESSIONAL APP CHALLENGE



## THE 19TH EDITION OF CODEWARS



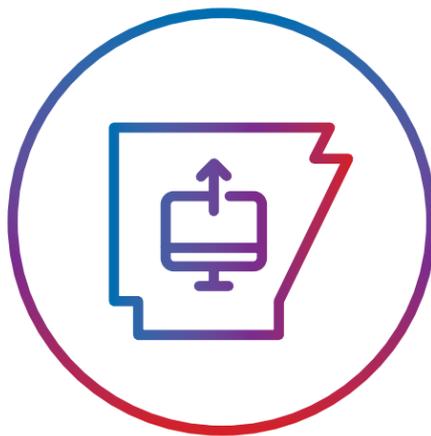
## CODING TOUR



- [The ADE supported](#) the Arkansas Computer Science Education Leadership Summit - D3: Deleting the Digital Divide - which focused on actively engaging all K-12 students in a superior and appropriate computer science education.
- [Governor Hutchinson visited several](#) Arkansas schools during his coding tour.
- [The ADE released a Student Enrollment](#) Presentation for the 2016-17 school year.
- [Districts, schools and individuals are encouraged](#) to participate in Computer Science Education Week, December 5-11.



On December 12, Governor Asa Hutchinson announced the signing of an MOU with Microsoft to implement a digital alliance promoting STEM education and economic development statewide.



Arkansas is the first state to create and adopt grade-specific computer science standards for all K-8 students.



On December 13, ADE State Director of Computer Science Education Anthony Owen facilitated two streamed informational sessions on new standards, courses and implementation.

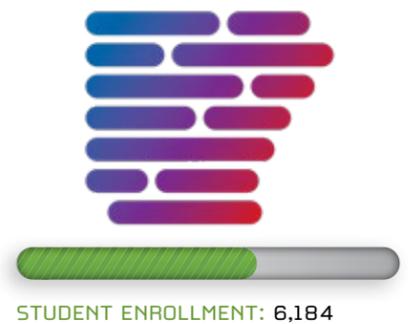
# PRACTICE MAKES PROCESS

Students Compete in the First Governor's All-State Coding Competition

CODING DEFINED

The `<PROCESSOR>` is a chip that does all of the computations for a computer. Many processors can perform trillions of calculations per second.

# 2017



In September 2016, during his computer science coding tour, Governor Hutchinson unveiled the Governor's All-State Coding Competition complete with scholarships and cash prizes for students and schools. The event was set to take place in spring 2017. This competition would be the first of its kind in the nation – and Arkansas was all over it. In total, **75 teams from across the state** participated in eight regional competitions. The top two teams from each region were invited to compete at the state level.

Verizon sponsored the inaugural competition, contributing **\$40,000** to the Arkansas Chamber of Commerce, which in turn awarded **529 college savings scholarships** to members of the top three teams. Winners were announced by Governor Hutchinson, in partnership with Verizon, at EAST Initiative in Little Rock. They were:

#### FIRST PLACE

Carson Cato\*, Brandon Cox and Jackson Gregory from the Arkansas School for Mathematics, Sciences and the Arts placed first and each received a \$2,000 scholarship.

#### SECOND PLACE

Martin Boerwinkle, Brock Davis and Joe Sartini from the Arkansas School for Mathematics, Sciences and the Arts placed second and each received a \$1,000 scholarship.

#### THIRD PLACE

Mason Brown, Gregory Maddra and Noah Wehn from Springdale Har-Ber High School placed third and each received a \$500 scholarship.

#### WINNING SCHOOL

The Arkansas School for Mathematics, Sciences and the Arts, which produced the competition's winning team, received an award of \$20,000.

The Governor's All-State Coding Competition was so successful, Verizon went on to pledge \$50,000 to sponsor the second year. A portion of those funds were to be used to train and certify additional computer science teachers throughout the state.

Today, the competition continues to attract coders from all across Arkansas – and continues to be fully funded by outside sources.

\*Carson passed away in July 2017. We grieve this loss and respectfully honor his achievement.

WINNERS



#### ALL-STATE CODING COMPETITION



We need more kids involved in STEM, not just for their benefit, but because the world needs them – their brains, their creativity and their experiences – to create the amazing solutions that will make our world a better place.



– Leslie Madere,  
Director of Business Sales for Verizon, 2017

# MORE 2017 HIGHLIGHTS

- [Arkansas becomes the first state](#) to meet all nine Code.org policy suggestions.
- [A statewide computer science](#) specialist support system is developed.
- [The ADE and the Arkansas Public School Resource Center](#) worked with Facebook/TechStart to secure a donation of 500 virtual reality kits for Arkansas schools and educational partners.
- [The ENIAC Programmers Project](#) documentaries – which feature women coders who changed the world – are made available on ArkansasIDEAS.
- [Arkansas was the only state to meet all 10](#) policy recommendations of the BNY Mellon's State of the States Landscape Report.
- [The "Coding in Arkansas" video](#) highlights interviews with Arkansas business leaders on the value of coding skills.
- [The ADE, in partnership with Virtual Arkansas](#), released the #ARKidsCanCode Computer Science Placement Survey to help guidance counselors and students choose the most beneficial computer science course.
- [Governor Hutchinson announced winners](#) of the Computer Science Enrollment Contest: Greenwood Freshman Academy, Forrest City High School and Bryant High School. Gravette High School won the drawing for a \$20,000 computer science grant.

- [The fourth annual](#) Arkansas Computer Science Education Summit focused on how Arkansas can engage all K-12 students in a superior and appropriate computer science education.
- [In its first year](#), the Arkansas Advanced Placement Computer Science Incentive Program awarded \$103,550 to students taking the AP exam.

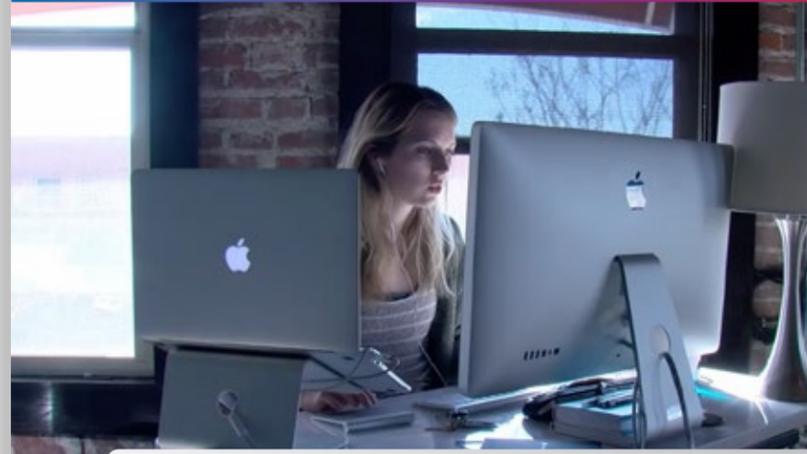
## GIRLS OF PROMISE CODING TOUR



- [Governor Hutchinson announced](#) a cyber range initiative with UCA and AETN.
- [The Girls of Promise](#) Coding Tour event encourages female students to develop an interest in coding.
- [Arkansas K-8 Computer Science](#) Lead Teacher Training and Stipend Program supports educator instruction.

- [ARCodeKids created a program](#) to include 12 adults who each will receive a \$6,000 scholarship to attend the 12-week Arkansas Coding Academy.
- [Girls of Promise, AT&T, Womens Foundation of Arkansas, AETN](#) and the ADE announce "Computer Science: Decide to Strive, Not Hide" as the winning video in a student contest.
- [The Office of Computer Science](#) allocated \$25,000 of the Computer Science Initiative budget to provide \$100 per-day stipends for computer science teachers to attend approved advanced training sessions.
- [ARCodeKids launch www.artechjobs.com](#), a job posting board for use at no cost to employers and job seekers.

## CODING IN ARKANSAS



Sixteen teachers receive \$1,000 scholarships to attend the 2018 Computer Science Teachers Association annual conference in Omaha, Nebraska.



A cross initiative promotion provides coding devices and coding-related books to approximately 900 public school libraries.

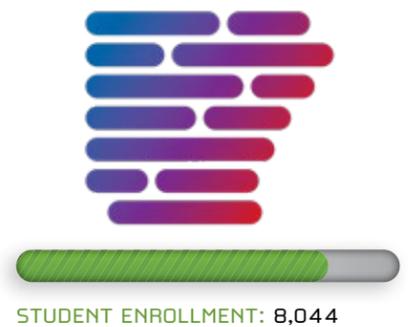
# FINDING OUR ALGORITHM

Arkansas Recognized for Increased Enrollment and Representation

CODING DEFINED

An **<ALGORITHM>** is a set of rules or processes to follow while creating a computer program.

# 2018



**In the 2018-19 school year**, only four years into the initiative, Arkansas reached its five-year goal of having more than 7,500 high school students enrolled in a high-quality computer science course, with a statewide enrollment of 8,044. After such a strong period of growth, a plateau would not be unexpected. Yet enrollment continues to climb at an impressive rate.

**Fall 2019 enrollment revealed a 22% increase** over the previous year, with 9,813 Arkansas students enrolled in a high school course. Of those students, 607 enrolled in more than one course, bringing course enrollments to more than 10,400. Clearly, Arkansas caught the vision for computer science.

**One of the most significant figures is female student enrollment.** Nationwide, the numbers are not great. Since the program began in Arkansas, however, we have gone from 223 female students enrolling in computer science courses to 2,852 females enrolled in 2019 – an incredible 1,179% increase.

**In addition to the raw number of female students enrolled** in computer science courses, Arkansas also saw an increase in their percentage representation – meaning that girls’ enrollment is increasing at a faster rate than boys’. Across all computer science courses, the representation of female students increased from 20% in the 2014-15 school year to 27% in 2019-20.

**In their latest report** – “2019 State of Computer Science Education: Equity and Diversity” – Code.org and the national computer science community identified Arkansas policy as having a profound effect on both overall high school growth and female enrollment.

**Not surprisingly, more and more Arkansas educators are adding** the 528 4-12 Computer Science Endorsement to their teaching license. These days, the vast majority of Arkansas students taking a computer science course do so in a face-to-face classroom rather than a virtual classroom. That’s great news, because even tech-savvy students need accessible, invested teachers.



We attribute this growth to state policy as well as our amazing Arkansas teachers. Over the past three years, hundreds of teachers have gone through professional development in computer science funded by the state.



– Anthony Owen,  
State Director of  
Computer Science  
Education, Arkansas  
Department of Education

# MORE 2018 HIGHLIGHTS

- [Participants engage](#) in the East Cybersecurity Training event.
- [Harvard provided](#) computer science professional development for Arkansas teachers. This is the first time the Harvard CS50 AP team has endorsed professional training away from its home campus.
- [Sasha Ariel Alston](#), author of “Sasha Savvy Loves to Code,” a children’s book aimed at getting girls excited about computer coding, came to Little Rock in April. All Arkansas schools received copies of the book.
- [Governor Hutchinson](#) visited 14 schools during his coding tours.
- [The second annual](#) Governor’s All-State Coding Competition was held at Arkansas State University in Jonesboro on May 5.
- [The 2018 Arkansas Computer Science](#) Educators Conference was held at Henderson State University.
- [The state Board of Education](#) adopted the Praxis™ Computer Science [5652] test.

## EAST CYBERSECURITY EVENT



## SASHA ARIEL ALSTON



## CODING TOUR



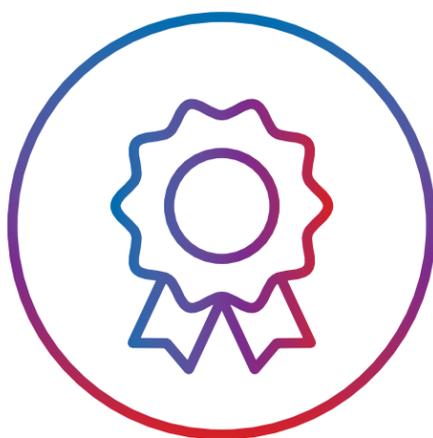
## VIRTUAL REALITY CONCUSSION EDUCATION PROGRAM

# CRASHCOURSE

- [Reimbursement is made available](#) for the 528 Computer Science Arkansas licensure application/renewal fee.
- [Teachers holding the 528 Computer Science](#) endorsement on their Arkansas educator’s license are eligible to receive a paid CSTA+ membership to the international Computer Science Teachers Association.
- [Arkansas becomes the first state](#) to launch CrashCourse, a virtual reality concussion education program.
- [The K-8 Computer Science Lead](#) Teacher Stipend and Training Program is continued and expanded.
- [Educators are eligible for \\$1,000](#) conference sponsorships to attend the 2019 Computer Science Teachers Association Annual Conference in Phoenix.
- [Governor Hutchinson and the ADE](#) announce the creation of the Computer Science Educator of the Year Award.
- [#ARKidsCanCode / #RISEArkansas](#) make announcements for Computer Science Education Week 2018.



Student enrollment statistics reveal continued progress.



Winners are announced for the Innovation in Computer Science School Grant Program.

# OPEN-SOURCE IDEAS

Arkansas Hosts First National Computer Science Summit for State Leaders

CODING DEFINED

`<OPEN SOURCE>` generally refers to any program whose source code is made freely available for use or modification by users or other developers.

# 2019



STUDENT ENROLLMENT: 9,813

On June 10, 2019, representatives from more than [30 states and Canada](#) met in Arkansas for the first National Computer Science Summit for State Leaders. The summit was an opportunity for high-level leaders – including governors, superintendents and education commissioners, legislators, nonprofit and corporate leaders – to share ideas on how states can [provide high-quality computer science education](#) for all students.



In addition to [Governor Asa Hutchinson](#), keynote speakers included Hadi Partovi, co-founder with his twin brother, Ali, of Code.org; plus Governor Kim Reynolds from Iowa and Governor Henry McMaster from South Carolina, who have both led the way in computer science education in their states.

The summit also debuted [The Arkansas Story](#), a video about how Arkansas launched the Computer Science initiative at the start of the Hutchinson administration in 2015. This video featured two success stories, including the work of Tate Rector, who changed careers from coaching football at Beebe High School to teaching computer science. He was a special guest at the summit.

[The response to the summit was overwhelmingly positive](#), with participants exchanging solutions that can be implemented in our own state, across the nation and beyond. Hosting this event was a great privilege for Arkansas. After all, one of the best things about being a national leader is paving the way for everyone else.

A Gallup survey found that

**9 OUT OF 10** parents

want their children to study

computer science, but

**ONLY 35%** of schools

offer high-quality instruction.

Nationally, there are more than

**500,000** computer

science jobs available, but

**ONLY 64,000**

graduates to fill those jobs.



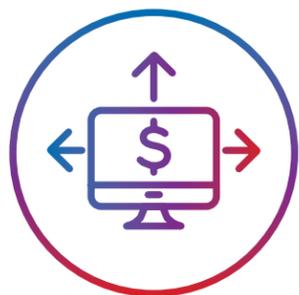
# SUMMIT SPOTLIGHT

## > Teacher Gerri McCann

Gerri McCann had been teaching French at Manila High School when she decided to expand to computer science – “another language.” She shared how her computer science program grew from seven students and one class to four classes. She’s seen many students go on to college to major in computer science or engineering. She also told of a student who didn’t have support at home and often missed school, until he discovered computer science.

# MORE 2019 HIGHLIGHTS

- [Many ongoing projects](#) and initiatives are continued and expanded from previous years.
- [Computer science course enrollment](#) increased by 1,769 students for a total of 9,813. This represents a 22% increase over 2018-19.
- [The Governor’s Spring 2019 Coding Tour](#) included Searcy, Monette (Buffalo Island), West Memphis, Brinkley, Elkins and Kirby. Fall visits included Midland High School (Pleasant Plains), Armored High School, Calico Rock High School, Forman High School, Sylvan Hills, Lonoke, Eureka Springs and Mulberry.
- [Arkansas Teacher of the Year](#) winners are announced and honored.
- [The “Computer Science: The Arkansas Story”](#) video is made to share how Arkansas has transformed computer science education at the state and national level.
- [Governor Hutchinson announced the expansion](#) of the ADE Computer Science Teacher Stipend Program, which will allow each high school computer science teacher to apply for up to \$10,000 in stipends over a five-year period. Stipends will come from the \$2.5 million in annual funding the governor has allocated for ADE to support the computer science initiative.



## CODING TOUR



## TEACHER OF THE YEAR WINNERS



## THE ARKANSAS STORY



# THE NEXT RUNTIME

Achieving Our Goals and Establishing New Ones

CODING DEFINED

# THE FUTURE

<RUNTIME>

is the period of time when a software program is on and running.

Arkansas is held in high regard in computer science, and is recognized for leading the national effort by entities such as Code.org and the Computer Science Teachers Association. We were the first state to pass comprehensive computer science legislation. We have experienced outstanding growth in student enrollment and teacher training. We were the first state to meet all nine Code.org policy suggestions. Our comprehensive strategic plan continues to serve as a model for other states' initiatives.

So - where do we go from here? These are our goals for the next five years:

1. Expand the "Computer Science Initiative" to a "Computer Science and Computing Initiative."
2. Fifty percent of Arkansas school districts will offer a computer science or computing pathway of three courses that lead to industry certification.
3. Every Arkansas high school will have at least one fully licensed computer science teacher who teaches a face-to-face computer science course.
4. Fifty percent of Arkansas school districts will have a partnership with business/industry or an institution of higher education to provide computer science internship opportunities or college-level computer science courses for students.

## FIVE YEARS OF GROWTH

9,813

Arkansas schools have increased student enrollment from approximately 1,000 students taking high school computer science in 2014-15 to 9,813 in 2019-20. Students enrolling in multiple courses bring total course enrollment to 10,420.

1,100

Approximately 1,100 Arkansas high school students took more than one computer science course in 2018-19.

225+

Arkansas has increased the number of computer science-certified teachers from approximately 20 in 2014 to more than 225 fully endorsed, and an additional 220 holding an approval code gained through development and training.

## IN THE WORKS



To meet these goals, our focus has to include computer science beyond K-12. While we will continue to support and build the K-12 system in a manner that keeps our state and students out front, Arkansas will also look at expanding higher education and direct-to-industry opportunities.



To kick off 2020 CSED Week on December 6, Governor Hutchinson established the 2020 Computer Science and Computing Task Force by executive order. This new task force will produce its final report by November 30, 2020. Full CSED Week details are available at <http://bit.ly/ARKidsCanCode>. Highlights included:

- Arkansas Cyber Education Pathway Partnership
- UALR Community Coding Night
- Middle School Central Arkansas Robotics Competition Grant
- Great Arkansas History Video Game Coding Competition
- AState Upskill Program
- Innovation Grant Awards Announcement
- Arkansas Students of Distinction in Computer Science Program



The state will keep up to date with new technologies, and security related to those technologies, which will be reviewed and added where feasible to support future expansion, growth, and coordination with higher education and workforce training.



High-demand cybersecurity education and focus will also be a top priority across the educational spectrum. In addition to building direct-to-job and internship opportunities for our students, Arkansas universities will add to and grow our 22 established cybersecurity programs, as well as expand the impact of the Arkansas Cyber Range.

# COMPUTER SCIENCE TRAINING

- > [The ADE Office of Computer Science](#) has provided grants for statewide computer science specialists to provide Arkansas educators with access to quality computer science professional development. To date, one-third of Arkansas educators – more than 12,000 – have received some level of computer science training from the Computer Science Specialist Team.

## FY19 TRAINING NUMBERS

# 5,215

**TOTAL EDUCATORS** received some level of CS training from July 1, 2018, to June 30, 2019

# 914

**HIGH SCHOOL EDUCATORS** were trained in various other 6-hour professional development sessions in computer science concepts

# 3,297

**K-8 EDUCATORS** were trained in Arkansas Computer Science Standards, model lessons and various tools and techniques, to demonstrate proper instruction in K-8 computer science

# 10+

**DIFFERENT COMPUTER SCIENCE** related trainings hosted, all facilitated by the #ARKidsCanCode team

# 214

**HIGH SCHOOL EDUCATORS** were trained in a 30-hour professional development; specialists provided mentorship to 80 educators (goal met) working to obtain their 528 endorsement

# 169

**HOURS OF TRAINING AND DIRECT SUPPORT** were provided in various classroom settings; in this time period, there were 1398 students impacted directly by the specialist team

# 621

**EDUCATORS (INCLUDING PRINCIPALS AND COUNSELORS)** were trained in computer science knowledge, laws, course codes and the overall mission through the ArkansasIDEAS overview course



**\$15 MILLION** in state funding has been allocated to the CSforAR initiative, with the majority of funds going to developing new computer science teachers.

ARCareerEd has awarded approximately **\$1 MILLION** to expand career-related computer science pathways, including robotics, mobile application development and cybersecurity academies.

Approximately **\$4 MILLION** in outside financial support has been provided to Arkansas for #CSforAR / #ARKidsCanCode

## WHY CYBERSECURITY



In today's online world, cybersecurity is critical. There have been many media reports focused on national and global deficits of information security professionals, and the data strongly confirm these reports. The number of people working as information security analysts has been growing in recent years, with a **6.6% employment growth** rate from 2015 to 2016 – far faster than any broad category of skilled workers – but the need continues to grow.

Not surprisingly, pay rates for information security analyst positions reflect strong demand, with median **hourly earnings of \$45.87** compared to \$37.90 for computer and mathematical occupations in general. This reflects the highest pay rate for any broad occupational category.

Even more impressive is the intensity with which employers are posting jobs for information security analysts. From September 2016 to October 2018, there were **398,058 unique job postings** for information security analysts nationally, compared to 114,103 jobs as of 2018. The ratio of recent job postings to existing 2018 jobs, then, was 3.49, which is very high compared to the same statistic calculated for any of the broad occupational categories of skilled workers.

## AP COMPUTER SCIENCE A INCENTIVE PROGRAM AWARDS

### 2017-18 SCHOOL YEAR (1ST YEAR OF PROGRAM)

- > \$103,550 awarded
- > 31 students made a 5
- > 46 students made a 4
- > 78 students made a 3

### 2018-19 SCHOOL YEAR (GROWTH IN ONE YEAR)

- > \$120,500 to be awarded [16% INCREASE]
- > 40 students made a 5 [29% INCREASE]
- > 60 students made a 4 [30% INCREASE]
- > 55 students made a 3 [29% DECREASE]



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